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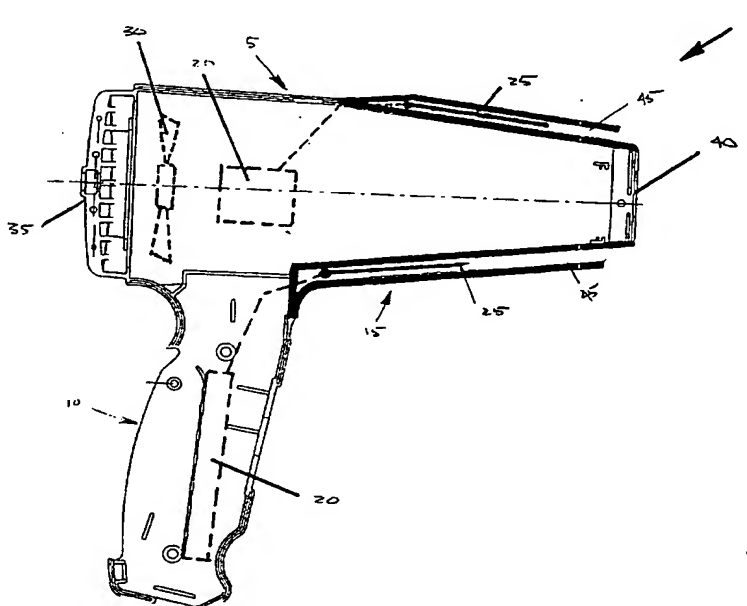
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(54) Title: AN ION GENERATING DEVICE



(57) Abstract: There is provided a device for hair care having a housing with at least one aperture, one or more ion generators for selectively generating concentrations of ions having different combinations of intensity and polarity, and one or more ion emitters for selectively emitting concentrations of ions having different combinations of intensity and polarity. The device can be any device or combination of such devices, suitable for use with hair and for to optimize the known beneficial effects of ionization to hair of the user.

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**AN ION GENERATING DEVICE****BACKGROUND OF THE INVENTION**5 1. Field of the Invention

The present invention relates to a device for generating ions. More particularly, the present invention relates to a device for treating and/or styling hair, as well as for generating a concentration of ionized air.

2. Description of the Prior Art

10 Benefits associated with air ionization are well known. It is also known to provide different devices with ways for generating and emitting ions. See for example, U.S. Patents Nos. 6,182,671, 5,957,090, 5,941,253, 5,150,491, 4,797,966, 4,500,939, 3,997,817, and 3,892,247. Further, it is known to provide different ion emitting devices with a blower  
15 for generating an airflow for directing the emitted ions. See for example U.S. Patents Nos. 6,191,930, 5,805,406, 5,612,849, 5,388,769, 5,055,963, and 4,258,408.

None of the above provide for a device that is capable of adjustably producing ions having different polarities, adjustably controlling the level of  
20 ion concentration, and adjustably manipulating the distribution and mix of ions with hair in combination with the feature that the ions are created outside a housing and at a distance from the head and/or hair of a user.

## SUMMARY OF THE INVENTION

It is an object of the present invention to provide a device with an improved ionic aeration effect.

- 5        It is another object of the present invention to provide such a device that can produce ions having different polarities and control the level of ion concentration.

- It is still another object of the present invention to provide such a device that creates a concentration of ions beyond a casing or housing, to  
10    maximize the concentration of ions about the head and/or hair of a user, as well as allow for the safe and efficient maintenance or replacement of at least one ion emitter.

It is yet another object of the present invention to provide such a device with an adjustable airflow controller.

- 15        It is further another object of the present invention to provide a number of attachments for cooperation with the device to control the distribution of the airflow as well as the mixing of ions with the airflow.

These and other objects and advantages of the present invention are achieved by a device that provides for an improved ion aeration effect.

- 20    The device has a housing, at least one ion generator for generating,

simultaneously or alternatively, ions with different polarities, and at least one ion emitter located outside the housing for emitting, simultaneously or alternatively, ions with different polarities. In addition, the device can have a blower for generating an airflow at a distance from the at least one ion  
5 emitter. Still further, the device can cooperate with a number of different attachments to manipulate the ionic aeration or the distribution and mix of ions with the air and hair of a user.

### BRIEF DESCRIPTION OF THE DRAWINGS

10 Fig. 1 is a lateral sectional view of a device, in accordance with a preferred embodiment of the present invention;

Fig. 2 is an end view of the device of Fig. 1;

Fig. 3 is an end view of a first attachment for cooperation with the device of Fig. 1, in accordance with an alternative embodiment of the  
15 present invention;

Fig. 4 is a lateral view of the first attachment of Fig. 3;

Fig. 5 is an end view of a second attachment for cooperation with the device of Fig. 1, in accordance with an alternative embodiment of the present invention;

20 Fig. 6 is a lateral view of the second attachment of Fig. 5;

Fig. 7 is an end view of a third attachment for cooperation with the device of Fig. 1, in accordance with an alternative embodiment of the present invention;

Fig. 8 is a lateral view of the third attachment of Fig. 7;

5        Fig. 9 is an end view of a fourth attachment for cooperation with the device of Fig. 1, in accordance with an alternative embodiment of the present invention;

Fig. 10 is a lateral view of the fourth attachment of Fig. 9;

Fig. 11 is an end view of a fifth attachment for cooperation with the  
10       device of Fig. 1, in accordance with an alternative embodiment of the present invention;

Fig. 12 is a lateral view of the fifth attachment of Fig. 11;

Fig. 13 is a perspective view of an alternative embodiment of the device of the present invention;

15       Fig. 14 is a lateral view of another alternative embodiment of the device of the present invention;

Fig. 15 is an exploded perspective view of still another alternative embodiment of the device of the present invention;

Fig. 16 is a plan view showing one possible arrangement of at least

one ion emitter associated with the device of Fig. 15;

Fig. 17 is a lateral view of yet another alternative embodiment of the device of the present invention;

Fig. 18 is an end view of the alternative embodiment of the device of  
5 Fig. 17; and

Fig. 19 is a perspective view of yet still another alternative embodiment of the device of the present invention.

#### DETAILED DESCRIPTION OF THE INVENTION

10 Referring to the drawings and more particularly to Figs. 1 and 2, there is shown a device in accordance with a preferred embodiment of the present invention generally represented by reference numeral 1. Device 1, as shown, preferably takes the form of a conventional hand held hair dryer having a housing 5 with a lower handle portion 10 and an upper barrel  
15 portion 15. Preferably device 1 also has one or more ion generators 20 for generating ions of positive polarity and ions of negative polarity, and one or more ion emitters 25 situated outside housing 5 for emitting ions of positive polarity and ions of negative polarity.

Preferably, housing 5 has a blower 30, an inlet 35, and an air outlet.  
20 Blower 30 is a conventional type blower that is sufficient for generating

airflow. Preferably, blower 30 draws air into housing 5 through air inlet 35, through the upper barrel portion 15 of housing 5, and out air outlet 40. Preferably, the air exiting air outlet 40 can be directed toward the hair of a user for drying and/or styling.

5           In addition, housing 5, preferably has a control (not shown) operatively connected to blower 30 for altering the intensity of the airflow, and thereby affecting the overall concentration of ions within the airflow. Preferably, the control can also be operatively connected to a heater (not shown), and/or the one or more ion generators 20, and/or the one or more  
10   ion emitters 25 for controlling the operation of each component.

As shown in Figs. 1 and 2, housing 5 can also have any configuration and/or feature known to be associated with conventional hair dryers. For example, Figs. 3 through 12 show various attachments that can selectively cooperate with housing 5 to manipulate the airflow exiting  
15   air outlet 40. Accordingly, the distribution and intensity of the airflow, as well as the aeration of ions with the airflow, is controlled.

Preferably, one or more ion generators 20 is situated in the lower handle portion 10 of housing 5. However, one or more ion generators 20 may also be located in the upper barrel portion 15 of housing 5. Further,  
20   one or more ion generators 20 may be located in both the lower handle portion 10 and upper barrel portion 15 simultaneously, as shown in Fig. 1. Still further, one or more ion generators 20 can be positioned at any

location suitable to optimize the effective operation of device 1.

In addition, one or more ion generators 20, preferably can be any suitable device capable of adjustably generating voltage outputs of varying intensities and of varying polarity combinations. Also, one or more ion  
5 generators 20 is/are electronically connected to one or more ion emitters 25. Further, one or more ion generators 20 and one or more ion emitters 25 are configured for safety, as well as for protection from damage caused by extensive use.

Preferably, the one or more ion emitters 25 is/are situated outside  
10 housing 5. Also preferably, one or more ion emitters 25 can selectively minimize dilution of ions with the airflow. Still further, preferably the one or more ion emitters 25 is/are located in a casing 45 on housing 5. Casing 45 can be integral with housing 5 or removable to allow easy access to the one or more ion emitters 25 for cleaning and/or replacement thereof. This  
15 can be important as dust and other air particles or contaminants tend to collect on ion emitters and can thereby interfere with the ionization process. Preferably, the casing configuration can also further reduce the degree to which the one or more ion emitters 25 is/are directly exposed to the airflow exiting air outlet 40, and thereby minimize the degree to which  
20 air born contaminants negatively affect the operation of the one or more ion emitters 25.

In addition, preferably the one or more ion emitters 25 can have any



configuration sufficient to emit ions having selectively different polarities and intensities, as well as to conform to the configuration and operation of device 1. For example, one or more ion emitters 25 can be in the form of a conductive needle, an array of such needles, a conductive plate, or any other like structure. Also, one or more ion emitters 25 can be formed from any material sufficient to effectively emit ions and conform to the configuration and operation of device 1, such as for example, a conductive metal, a conductive polymer, or a carbon material. Further, the one or more ion emitters 25 can be made of a conductive semi-fluid, such as a silicon gel. Still further, one or more ion emitters 25 preferably creates a concentration of ions having either a negative polarity or a positive polarity, or some combination thereof. One or more ion emitters 25 can also preferably be arranged to create a predictable area of concentrated ions sufficient to encompass the area proximate the head of a user and to intensify the exposure of ions to the hair. If device 1 employs blower 30 for generating an airflow, preferably one or more ion emitters 25 is/are situated at a distance from the airflow.

Having described in detail the preferred embodiment of the present invention, it is appreciated that details may be modified in a variety of ways and that alternative embodiments are also within the scope of the present invention. Thus, device 1 can preferably be any device suitable for use with hair, such as for example, a hatchet hair dryer, as shown in Fig. 13, an air curling iron, as shown in Fig. 14, a hooded salon style hair dryer, as

shown in Figs. 15 and 16, a hair straightening iron or brush, as shown in Figs. 17 and 18, or a conventional hair curling iron, as shown in Fig. 19.

The process of using device 1 comprises, regardless of the embodiment employed, adjustably creating various ion concentrations.

5 Each concentration has a different polarity combination so that the ions are created at a distance from the head and/or hair of a user in order to optimize the known beneficial effects of ionization to the user. Further, if the embodiment of device 1 has a blower for generating an airflow, the process of using the device can preferably include adjustably creating the  
10 various concentrations of ions at a distance from the airflow generated by the blower in order to minimize any dilution resulting from direct exposure to the airflow and to maximize ionization of the air proximate the head and/or hair of the user. Still further, the process of using device 1 can preferably include employing a variety of attachments, see Figs. 3 through  
15 12, adapted for selective cooperation with the device for adjustably controlling the mix and distribution of the ion concentration.

The present invention having been thus described with particular reference to the preferred forms thereof, it will be obvious that various changes and modifications may be made therein without departing from  
20 the spirit of the present invention as defined herein.

**WHAT IS CLAIMED:**

1. A device comprising:  
  
a housing;  
  
one or more ion generators for generating ions of positive polarity  
5 and ions of negative polarity;  
  
one or more ion emitters for emitting ions of positive polarity and  
ions of negative polarity;  
  
wherein said one or more ion emitters is/are situated adjacent, but  
outside said housing.
- 10 2. The device of claim 1, wherein said ions form an ion  
concentration outside said housing and at a distance from a user's hair.
3. The device of claim 2, wherein said hair is encompassed by  
said ion concentration.
4. The device of claim 1, further comprising at least one blower  
15 for generating airflow to be applied to hair.
5. The device of claim 4, wherein said housing has at least one  
aperture disposed therein forming an air outlet for directing said airflow.
6. The device of claim 5, wherein said one or more ion emitters  
is/are situated at a distance from said airflow.

7. The device of claim 6, further comprising at least one attachment for cooperating with said air outlet to manipulate said airflow.

8. The device of claim 7, wherein said at least one attachment is configured to variably control aeration of said positive and negative ions  
5 into said airflow.

9. The device of claim 8, wherein said at least one blower alters said airflow velocity, thereby controlling aspiration of said positive and negative ions into said airflow.

10. The device of claim 1, wherein said one or more ion  
10 generators is/are configured to provide a variety of voltage outputs, as well as to generate combinations of positive and negative ions.

11. The device of claim 1, wherein said one or more ion emitters is/are positioned in a casing formed on said housing.

12. The device of claim 11, wherein said casing is selectively  
15 removable from said housing.

13. The device of claim 1, wherein said one or more ion emitters is/are formed from a conductive metal.

14. The device of claim 1, wherein said one or more ion emitters is/are formed from a conductive polymer.

20 15. The device of claim 1, wherein said one or more ion emitters

is/are formed from a conductive silicon.

16. The device of claim 1, wherein said ion emitters form an array.

17. The device of claim 1, wherein said one or more ion emitters  
5 create an ion concentration having a negative polarity.

18. The device of claim 1, wherein said one or more ion emitters create an ion concentration having a positive polarity.

19. The device of claim 1, wherein said one or more ion emitters create an ion concentration having both a positive and negative polarity.

10 20. The device of claim 1, wherein said ion emitters is/are arranged to generate a predictable area of concentrated ions and to minimize any dilution resulting from direct exposure to said airflow.

21. A method for treating hair comprising the steps of:

providing a device having a housing with at least one air outlet  
15 disposed therein, a blower for generating an airflow stream, one or more ion generators, and one or more ion emitters disposed outside, but adjacent said housing and spaced a distance from said airflow exiting said air outlet;

applying said blower generated airflow toward hair for drying and/or  
20 styling; and

generating an ion concentration having a certain area and spaced a certain distance from said airflow to minimize any dilution resulting from direct exposure to said airflow.

22. The method for treating hair of claim 21, further comprising  
5 the step of providing at least one attachment for cooperating with said air outlet of said housing for controlling the mixing of said ion concentration with said airflow stream and hair.

23. The method for treating hair of claim 22, wherein said at least one attachment is configured to variably control aspiration of said positive  
10 and negative ions into said airflow.

24. The method for treating hair of claim 23, wherein said at least one blower alters said airflow velocity, thereby controlling said aspiration of said positive and negative ions into said airflow.

25. The method for treating hair of claim 21, wherein said at least  
15 one ion generator is configured to provide a variety of voltage outputs, as well as to generate combinations of positive and negative ions.

26. The method for treating hair of claim 21, wherein said one or more ion emitters is/are positioned in a casing formed on said housing.

27. The method for treating hair of claim 21, wherein said one or  
20 more ion emitters is/are formed from a conductive metal.

28. The method for treating hair of claim 21, wherein said one or more ion emitters is/are formed from a conductive polymer.

29. The method for treating hair of claim 21, wherein said one or more ion emitters is/are formed from a conductive silicon.

5 30. The method for treating hair of claim 21, wherein said ion emitters form an array.

31. The method for treating hair of claim 21, wherein said one or more ion emitters create an ion concentration having a negative polarity.

10 32. The method for treating hair of claim 21, wherein said one or more ion emitters create an ion concentration having a positive polarity.

33. The method for treating hair of claim 21, wherein said one or more ion emitters create an ion concentration having both a positive and negative polarity.

15 34. The method for treating hair of claim 21, wherein said one or more ion emitters is/are arranged to generate a predictable area of concentrated ions and to minimize any dilution resulting from direct exposure to said airflow.

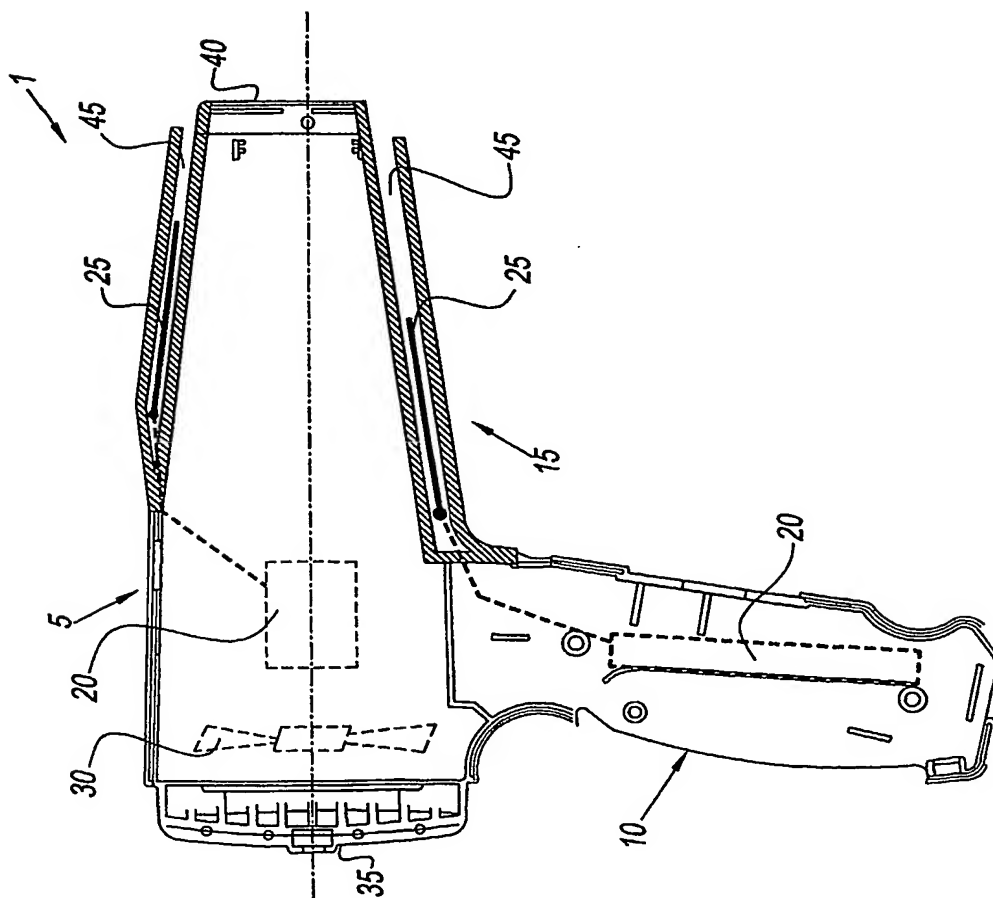


Fig. 1

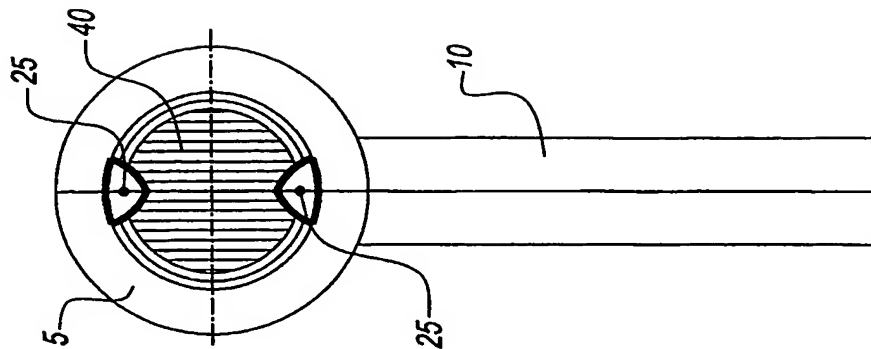


Fig. 2



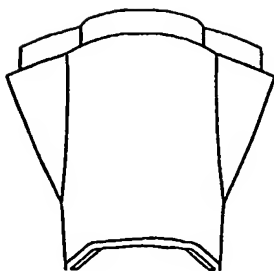


Fig. 4

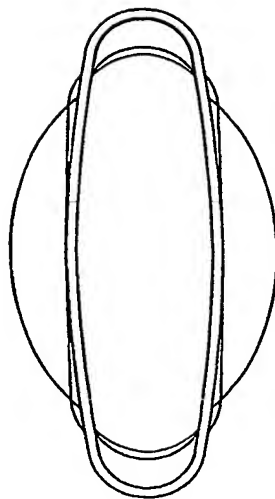


Fig. 3

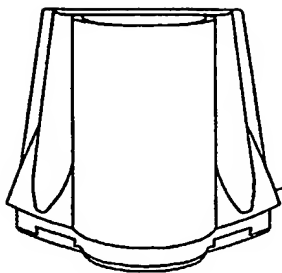


Fig. 6

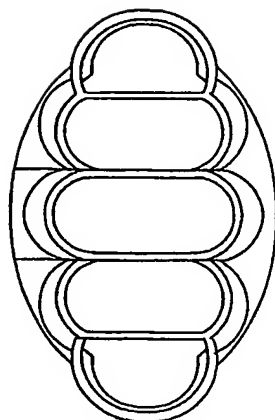


Fig. 5

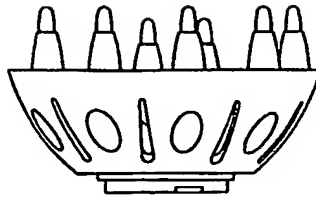


Fig. 8

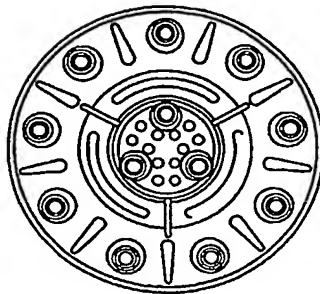


Fig. 7

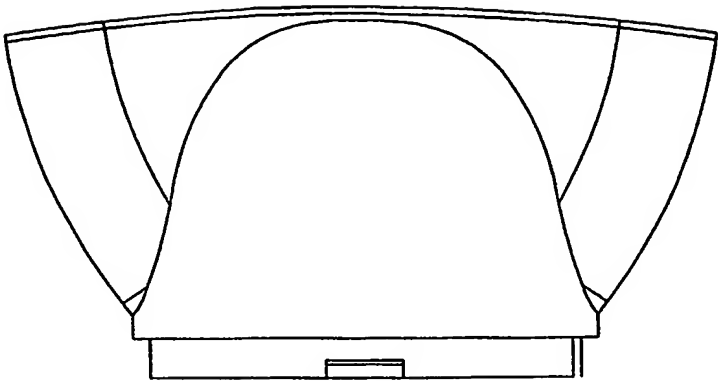


Fig. 10

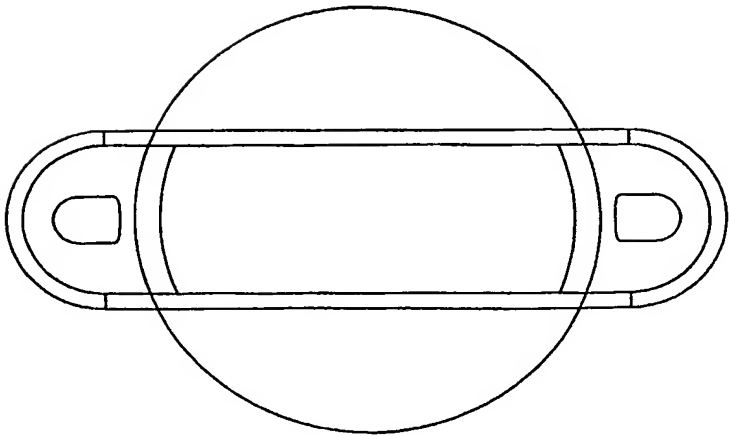


Fig. 9

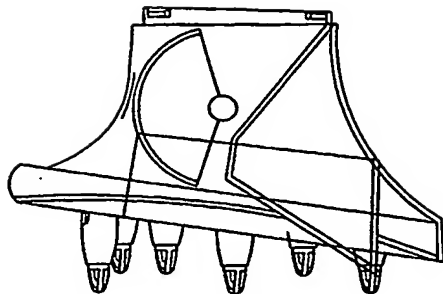


Fig. 12

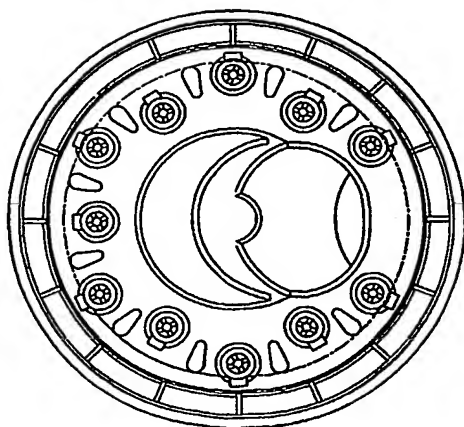


Fig. 11

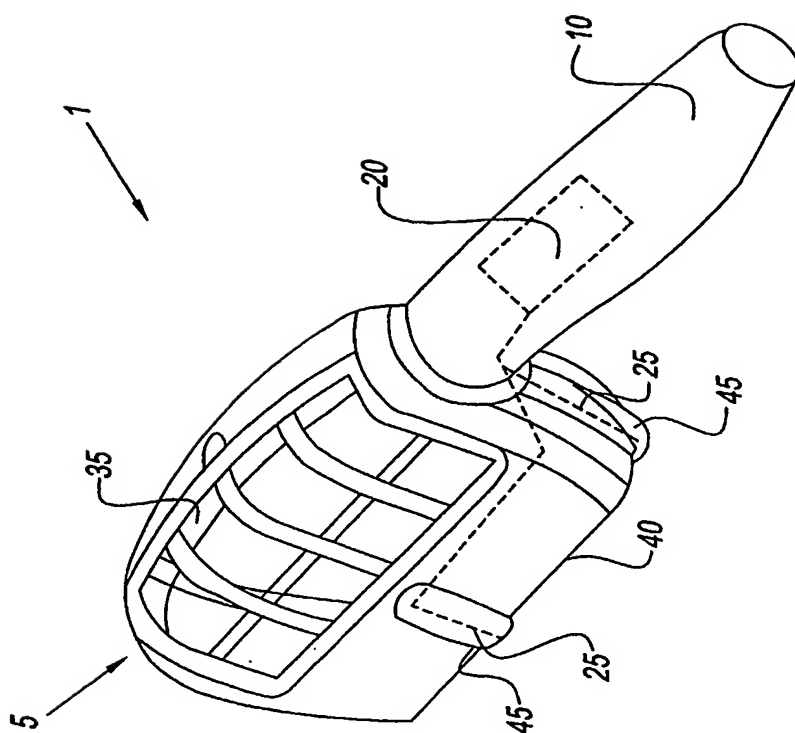


Fig. 13

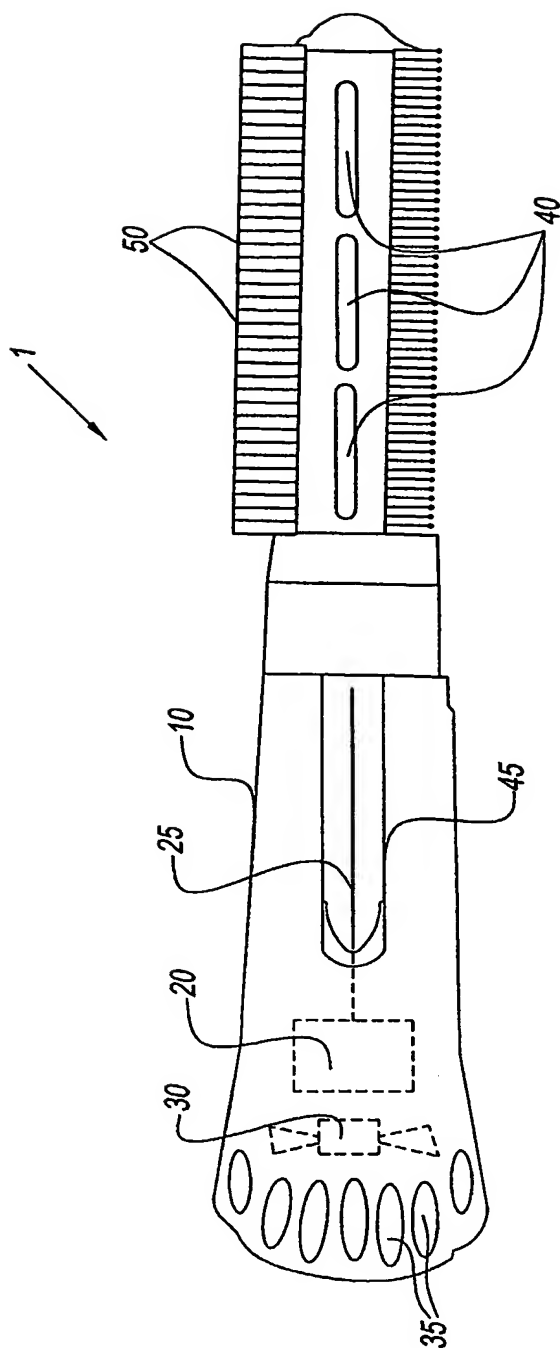


Fig. 14

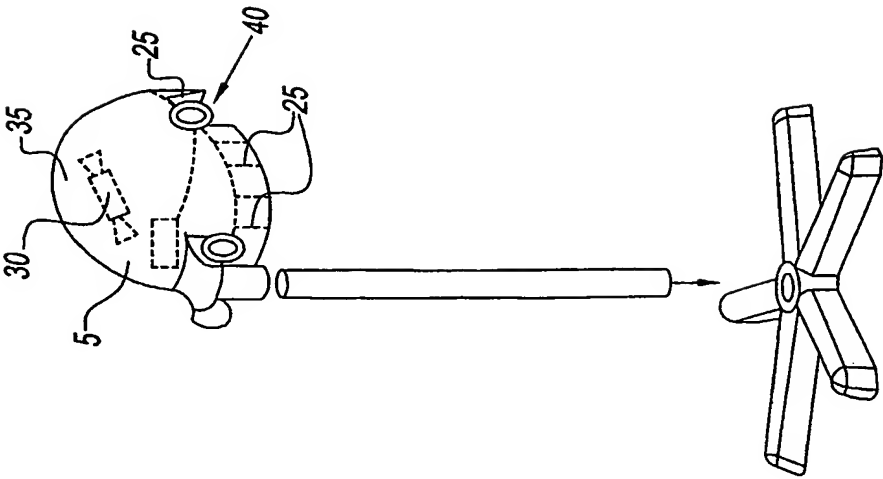


Fig. 15

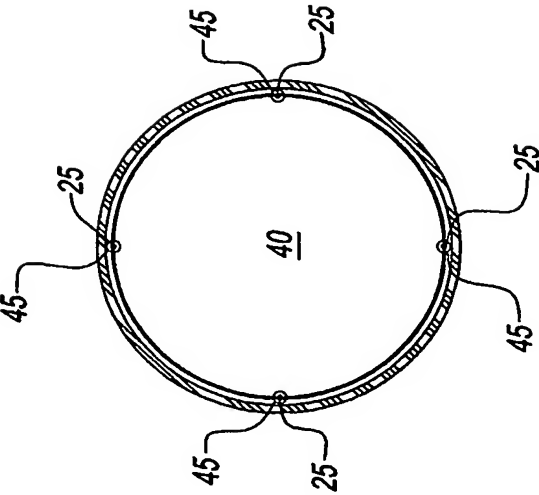


Fig. 16



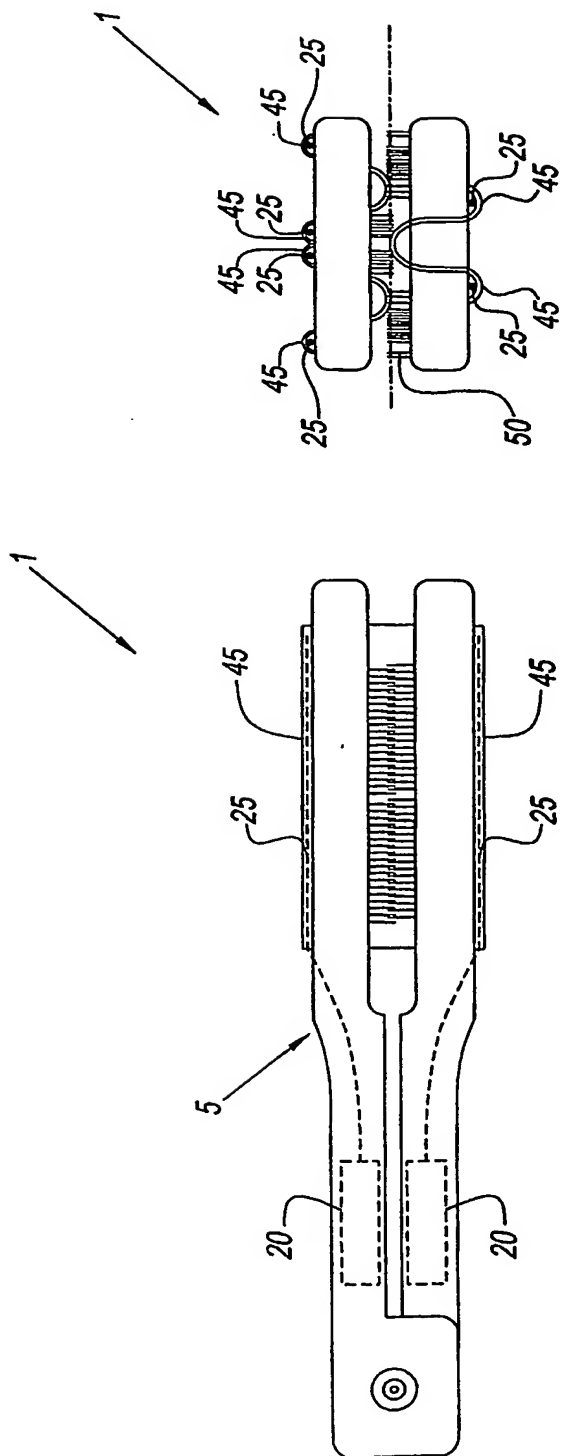


Fig. 18

Fig. 17

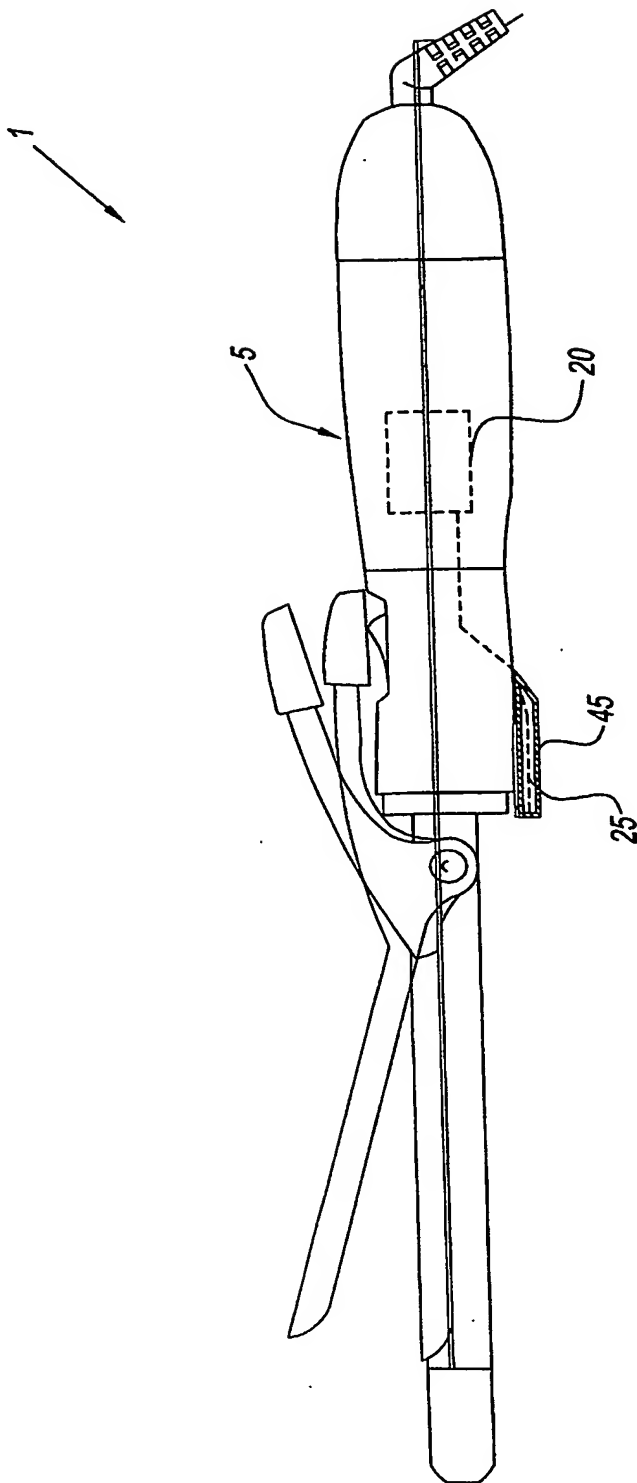


Fig. 19